REMARKS

Applicants thank the Examiner for the very thorough consideration given the present application.

Claims 1-3 and 5-12 are now pending in this application. Claims 1 and 6 are independent. Claims 1, 3 and 5-6 have been amended.

Reconsideration of this application, as amended, is respectfully requested.

Proposed Drawing Correction

Original Fig. 1 erroneously illustrated the epoxy PCB 12 being mounted in a groove. However, as described at page 1, lines 17-22, the epoxy PCB 12 is disposed on an upper surface of the ceramic PCB 11 with a socket 13 disposed therebetween. Thus, there was no description of the epoxy PCB 12 being mounted in a groove in the conventional art, and Fig. 1 was in error in this aspect.

Therefore, it is proposed to correct Fig. 1 as per the attached corrected drawing, which shows how the epoxy PCB is disposed on the ceramic PCB, without being mounted in a groove, as was originally described in the specification.

R jections Und r 35 U.S.C. § 103

Claims 1-12 stand rejected under 35 U.S.C § 103(a) as being unpatentable over Applicants' admitted prior art in view of Lu et al. (U.S. Patent No. 5,933,343). This rejection is respectfully traversed.

The present invention relates to a "one system module" structure in which power pins are mounted on a ceramic PCB and signal pins are mounted on an epoxy PCB, to reduce the need for using sockets, thereby increasing areal utility of the PCB and obtaining a compact module. Also, the present invention relates to a "one system module" which is capable of preventing pins from being gathered together at one side, which conventionally leads to a difficulty in fabricating an instrument.

The one system module according to independent claim 1 of the present invention recites a combination of elements including a module body including an inside surface having a first groove formed at a lower portion thereof and a second groove formed at a mid portion thereof, wherein a ceramic PCB is supported in the first groove so as to be disposed inside the module body and an epoxy PCB is supported in the second groove so as to be disposed inside the module body; one or more power pins mounted on the upper surface of at least one edge of the ceramic PCB, the power pins being for receiving power from a power source external to the module body; and one or more signal pins mounted on an upper surface of at least one edge of the epoxy PCB, the signal pins being for receiving and transmitting various signals from and to an

element(s) external to the module body. Similar limitations are set forth in independent claim 6. Applicants respectfully submit that these combinations of elements as set forth in independent claims 1 and 6 are not disclosed or made obvious by the prior art of record.

As depicted in Figure 4, the ceramic PCB 101 is supported in the first groove so as to be disposed inside the module body 100 and the epoxy PCB 102 is supported in the second groove so as to be disposed inside the module body 100. Thus, the one system module according to the present invention is capable of firmly supporting the epoxy PCB and the ceramic PCB by respectively mounting the ceramic PCB and epoxy PCB in the respective grooves so as to be disposed inside the module body.

Also, as depicted in Figure 4, the power pins are mounted on the upper surface at the edges of the ceramic PCB, and the signal pins are mounted on the upper surface at the edges of the epoxy PCB, so as to prevent the pins from gathering together at one side which conventionally leads to a difficulty in fabricating an instrument. Thus, the one system module according to the present invention is capable of preventing the pins from being gathered together at one side by respectively mounting the power pins on the upper surface of at least one edge of the ceramic PCB and the signal pins on an upper surface of at least one edge of the epoxy PCB, as in the claimed invention.

The Applicants' admitted conventional art discloses a one system module in which a socket is placed between a ceramic PCB and an epoxy PCB

that are disposed inside a module body, and a power element and signal elements are respectively mounted on the upper portion of each PCB. However, the one system module of the Applicant's admitted conventional art, in which the socket is used to connect the ceramic PCB and the epoxy PCB and pins are disposed on the ceramic PCB, has problems that, if the ceramic PCB and the epoxy PCB are not firmly supported, a poor contact occurs, shortening the durability due to variation of the product. In addition, because of the use of the socket, the usable space of the PCB is reduced, running counter to a compact module structure.

That is, the Applicants' admitted conventional art does not teach or suggest the recited epoxy PCB supported in the second groove so as to be disposed inside the module body. Also, the Applicants' admitted conventional art does not teach or suggest the recited signal pins mounted on the upper surface at at least one edge of the epoxy PCB.

Consequently, the Applicants' admitted conventional art is not capable of firmly supporting the epoxy PCB by mounting the epoxy PCB in the groove so as to be disposed inside the module body, as in the claimed invention. Also, the Applicants' admitted conventional art is not capable of preventing the pins from being gathered together at one side by respectively mounting the power pins on the upper surface at at least one edge of the ceramic PCB and the signal pins on the upper surface at at least one edge of the epoxy PCB, as in the claimed invention.

These shortcomings of Applicants' admitted conventional art are not overcome by the inclusion of the Lu et al. reference in the rejection.

The Lu et al. (5,933,343) reference discloses a module disclosing pin terminals 24, soldered to control board 14, interconnect power converter module 10 to host board 5. As depicted in Figure 2, the power converter module 10 is shown with control board 14 spaced from power board 12 using spacers 26 and with I/O terminals 32 and terminals pins 24 extending through holes 30 of the control board. Also, the control board 14 is formed of an insulating substrate 22 (e.g., glass epoxy laminate) having a thickness of about 0.032 inches. The control board 14 includes a conductive metal pattern for interconnecting components 16 mounted to the control board and associated with the control circuitry and, therefore, generate much lower level signals as compared to power board 12.

However, the Lu et al. (5,933,343) reference does not teach or suggest the recited ceramic PCB supported in the first groove so as to be disposed inside the module body and the epoxy PCB supported in the second groove so as to be disposed inside the module body. Also, the Lu et al. (5,933,343) reference does not teach or suggest the recited power pins mounted on the upper surface at at least one edge of the ceramic PCB, or/and the signal pins mounted on the upper surface at at least one edge of the epoxy PCB which is supported in the second groove so as to be disposed inside the module body.

Consequently, the Lu et al. (5,933,343) reference is not capable of firmly supporting the epoxy PCB and the ceramic PCB by respectively mounting the ceramic PCB and epoxy PCB in the groove so as to be disposed inside the module body, as in the claimed invention. Also, the Lu et al (5,933,343) reference is not capable of preventing the pins from being gathered together at one side by respectively mounting the power pins on the upper surface at at least one edge of the ceramic PCB and the signal pins on the upper surface of at least one edge of the epoxy PCB, as in the claimed invention.

Applicants respectfully submit that the present invention as claimed in independent claims 1 and 6 is not taught or suggested by the combination of Applicants' admitted conventional art in view of the Lu et al. (5,933,343) reference. Accordingly, reconsideration and withdrawal of this rejection are respectfully requested.

CONCLUSION

All of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicants therefore respectfully request that the Examiner reconsider all presently outstanding rejections and that they be withdrawn.

It is believed that a full and complete response has been made to the Office Action, and as such, the present application is in condition for allowance.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Mr. Scott L. Lowe (Reg. No. 41,458) at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and further replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17; particularly, extension of time fees.

Respectfully submitted,

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Enclosures: Version with Markings to Show Changes Made
Letter to Official Draftsperson

VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the Claims

Claims 1, 3 and 5-6 have been amended as follows:

1. (Amended) A one system module in which [a socket is placed between] a ceramic printed circuit board (PCB) and an epoxy PCB [that] are disposed inside a module body, a power element and signal elements [are] being respectively mounted on [the] an upper portion of each PCB, the one system module further comprising: [wherein a groove is made at the lower side surface and at the middle side surface of the module body to support the ceramic PCB and the epoxy PCB to form a two-story structure, and a power pin for receiving a power signal from an external source is mounted on the upper portion of at least one edge of the ceramic PCB and a signal pin for receiving various signals from an external source is mounted on the upper portion of at least one edge of the epoxy PCB in line with the power pin.]

a module body, the module body including an inside surface having a first groove formed at a lower portion thereof and a second groove formed at a mid portion thereof, wherein the ceramic PCB is supported in the first groove so as to be disposed inside the module body and the epoxy PCB is supported in the second groove so as to be disposed inside the module body;

at least one power pin mounted on the upper surface at at least one edge of the ceramic PCB, the power pin being for receiving power from a source external to the module body; and

at least one signal pin embedded inside the module body and mounted on the upper surface at at least one edge of the epoxy PCB, the signal pin being for receiving and/or transmitting various signals from/to elements external to the module body.

3. (Amended) The one system module according to claim 1, wherein the at least one power pin is mounted on the ceramic PCB by soldering, while the at least one signal pin is mounted on the epoxy PCB by soldering.

5. (Amended) The one system module according to claim 1, wherein the power pins are mounted on the upper portion [of both] edges of the ceramic PCB and the signal pins are mounted on the upper portion [of both] at at least two opposed edges of the epoxy PCB in line with the power pins.

6. (Amended) A one system module comprising:

a module body, said module body including an inside surface having a first groove formed at a lower portion thereof and a second groove formed at a mid portion thereof;

a ceramic printed circuit board (PCB) supported in said first groove so as to be disposed inside said module body, said ceramic PCB having power elements secured thereto;

an epoxy PCB supported in said second groove so as to be disposed inside said module body, said epoxy PCB having signal elements secured thereto;

a socket located between said ceramic PCB and said epoxy PCB, said socket establishing electrical communications between said power elements of said ceramic PCB and said signal elements of said epoxy PCB;

at least one [a] power pin mounted on an upper surface and along a first edge of said ceramic PCB, said power pin being for receiving [a] power [signal] from a source external to said module body; and

at least one [a] signal pin mounted on an upper surface and along a first edge of said epoxy PCB, said signal pin being for receiving and/or transmitting various signals [from] from/to elements [a source] external to said module body, wherein said signal pin is linearly arranged relative to said power pin.